FIN 401-041 Managerial Finance
Ryerson University
Midterm Exam -- Lu Zhang
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Version A -- Solution

1. Which version of the exam do you have? This is a free mark – take it. Make sure you answer it correctly, though.

   A. Version A
   B. Version B
   C. Version C

2. Courtland Corp. is considering whether or not to purchase a new piece of equipment for $120,000. It will cost another $5,000 to have the equipment delivered and installed. This new equipment will increase the firm's pre-tax revenue by $45,000 per year for the next 6 years, and will have a salvage value of $6,000. The firm's WACC is 12% and the tax rate is 40%. The CCA rate for this equipment is 35%. What would be the NPV of buying this equipment? Round all components to the nearest dollar in calculating the NPV.

   A. 45,625
   B. 23,382
   C. 97,387
   D. 26,972
   E. 29,332

I_0 = 120,000 + 5,000 = 125,000

PV(annual CF) = PV(pmt=45,000(1-40%), N=6, I% = 12%) = 111,008*

PV(S_n) = 6,000/(1+12%)^6 = 3,040

*PV(CCATS) = [125,000*0.35*0.4/(0.35+0.12)]*[(1+0.5*0.12)/(1+0.12)] – [6,000*0.35*0.4/(0.35+0.12)]* [1/(1+0.12)^6] = 34,334*

NPV = - I_0 + PV(annual CF) + PV(Sn) + PV(CCATS) = -125,000 + 111,008 + 3,040 + 34,334 = 23,382

3. Suppose a company has a bond outstanding that has 20 years left to maturity. The bond is currently trading at $815 with a par value of $1,000. The coupon rate is 6% and coupons are paid semiannually. What is the company's cost of debt?

   A. 3.92%
   B. 6%
   C. 7.46%

D. 7.84%
E. 15.73%

*Use the rate function: Rate(PV= -820, Pmt=1,000*6%/2, N= 20*2, FV=1,000) = 3.92%.*
*Cost of Debt = YTM = 3.92%*2 = 7.84%*

4. The cash flow of a proposed new project is listed below. The firm has a WACC of 15%. What is the IRR of this project and should it be accepted?

A. IRR = 10.40%; Accept because IRR<WACC
B. IRR = 10.40%; Reject because IRR<WACC
C. IRR = 16.14%; Accept because IRR>WACC
D. IRR = 16.14%; Reject because IRR>WACC
E. IRR = 15%; Accept or reject because IRR = WACC

Year	Cash Flow
0	-$1,300,000
1	$420,000
2	$550,000
3	$630,000

Use the IRR function in your calculator. Create cash flow list:
CF0 = -1,300,000, CF1= 420,000, CF2 = 550,000, and CF3 = 630,000. Calculate IRR. IRR =10.40%<15% WACC, reject the project.

5. TransNorth Inc. currently has 50,000 bonds outstanding which are trading at $960 per share. The company also has 2,000,000 shares of shares outstanding which are trading at $56 per share. The risk-free rate is 4%, the market risk premium is 10%, and the corporate tax rate is 34%. TransNorth has a beta of 1.2 and the cost of debt is 6.8%. What is the company's WACC?

A. 9.19%
B. 12.55%
C. 13.24%
D. 15.71%
E. 16%

*$R_E = R_f$+ beta*MRP = 4% + 1.2*10% = 16%, V_E = 2,000,000 *56 = 112,000,000*
*R_D = 6.8%, V_D = 50,000 * 960 = 48,000,000*
w_E = 112,000,000/(112,000,000+ 48,000,000) = 0.7, and w_D = 1- 0.7 =0.3
*WACC = $R_E*w_E+R_D*w_D*(1-T_c)$=16% * 0.7 + 6.8%*0.3*(1-0.34) = 12.55%*

6. A company is choosing between project A and B. In other words, the two projects are mutually exclusive. The payback period, IRR, and NPV of the two projects are listed below. Which project should the company choose and why?

Decision Rules	Project A	Project B
Payback period	3.2 years	4.5 years
IRR	19.68%	18.90%

NPV	$356,678	$520,431

A. Project A, because Project A has a shorter payback period.
B. Project B, because Project B has a short payback period and higher IRR.
C. Project A, because Project A has a higher IRR.
D. Project B, because Project B has a lower IRR.
E. Project B, because Project B has a higher NPV.

When projects are mutually exclusive or when there is a conflict between NPV and another decision rule, you should always choose the one with highest NPV.

7. Suppose that IMB just paid a dividend of $2 per share yesterday. The company expects the dividend to grow at 5% per year in perpetuity. The current share price is $40. What is IMB's cost of equity?

A. 5%
B. 5.51%
C. 10%
D. 10.25%
E. 10.51%

$D_0 = 2$ -> $D_1=2*(1+5\%) = 2.1$
$R_E = D_1/P_0 + g = 2.1/40 + 0.05 = 10.25\%$

Please use the following information to answer the next THREE questions.

BlueBay Inc. is trying to decide whether to lease or buy a new management information system. The new system will improve the operation efficiency and increase the pre-tax revenue by $950,000 per year for the next 5 years. The system costs $2,250,000 to buy and qualifies for a 30% CCA rate. The salvage value will be $18,000 in 5 years. As an alternative, the company can lease the system from an IT service company for $550,000 per year for 5 years. Lease payments have to be made at the beginning of each year. The company has a tax rate of 40% and can borrow at 9.5%.

8. What is the present value of all the after-tax lease payments?

A. 1,267,104
B. 1,387,479
C. 1,401,499
D. 1,481,384
E. 2,468,973

After-tax annual lease payment (ATLP) = 550,000(1-40%) = 330,000*
*After-tax cost of debt = 9.5% *(1-40%) = 5.70%*

PV(ATLP) = PV(pmt = 330,000, N = 5, I% = 5.7, BGN) = 1,481,384

9. Pretend now that the total present value of all of the after-tax lease payments is $1,600,000. What would be the NAL from BlueBay? Round all NAL components to the nearest dollar in your calculation.

   A. -11,853
   B. -94,968
   C. -85,910
   D. 636,357
   E. 638,566

I_0 =2,250,000
PV(ATLP) = 1,600,000
PV(Sn)=18,000/(1+5.7%)^5 = 13,643
*PV(CCATS) = [2,250,000*0.3*0.4/(0.3+0.057)]*[(1+0.5*0.057)/(1+0.057)]-[18,000*0.3*0.4/(0.3+0.057)]*[1/(1+0.057)^5]=731,325*
NAL of the lessee = I_0 – PV(ATLP) – PV(Sn) – PV(CCATS)
= 2,250,000 – 1,600,000 – 13,643 – 731,325 = -94,968

10. Pretend now that BlueBay has a corporate tax rate of 0%. What would be the lease payment that will make the company indifferent between buying and leasing the system?

    A. 498,181
    B. 531,898
    C. 532,424
    D. 582,428
    E. 583,004

Break-even lease payment under 0% tax: NAL = I_0-PV(ATLP) – PV(Sn) = 0
PV(S_n) = 18,000/(1+0.095)^5 = 11,434
2,250,000 – PV(ATLP) – 11,434 = 0 -> PV(ATLP) = 2,238,566
Annual lease payment = PMT(PV = 2,238,566, N = 5, I% = 9.5%, BGN) = 532,424

11. Given the same lease contract, a tax-exempt lessee benefits _____ from leasing than a taxable lessee does.

    A. More
    B. Less
    C. The same
    D. Not enough information

Firms in lower (or zero) tax bracket benefit more from leasing because they lose less (or zero) CCA tax shield.

12. Firm A just signed a lease agreement with Firm B with the following terms. Firm A (the lessee) will pay Firm B (the lessor) $6,000 per month for the next 6 month to use a production line owned by Firm B. Firm B will be responsible for the maintenance cost, taxes, and insurance for the production line. This agreement is an example of _____.

    A. Repurchase agreement
    B. Operating lease
    C. Financial lease
    D. None of the above

This is an operating lease agreement, because it is short-term and the lessor is responsible for the maintenance, tax, and insurance costs.

Please use the following information to answer the next THREE questions.
Consider two firms identical in every way except that the capital structure of Firm U is all-equity and Firm L has $1,200,000 of debt with 6% cost of debt. The unlevered cost of capital for Firm U is 15%. Both firms have an EBIT of $900,000 per year in perpetuity.

13. Assume no corporate tax. What is the value of Firm U (the all-equity firm)?

    A. 900,000
    B. 6,000,000
    C. 8,000,000
    D. 15,000,000
    E. None of the above.

$V_L = V_U = EBIT/R_U = 900,000/15\% = 6,000,000$

14. Assume no corporate tax. What is the cost of equity for Firm L?

    A. 6.00%
    B. 15.00%
    C. 16.80%
    D. 17.25%
    E. None of the above.

$D/E = 1,200,000/(6,000,000 - 1,200,000) = 1/4$
$R_{E,L} = R_U + (R_U - R_D)*(D/E) = 15\% + (15\% - 6\%)*(1/4) = 17.25\%$

15. Now assume both Firm U and Firm L face 40% corporate tax rate. What is the value of Firm L's equity?

A. 2,880,000
B. 3,600,000
C. 4,080,000
D. 5,280,000
E. 6,000,000

$V_U = EBIT*(1-T_c)/R_U = 900,000*(1-40\%)/15\% = 3,600,000$
$V_L=V_U + T_c*D = 3,600,000 + 40\%*1,200,000 = 4,080,000$
$E = V_L – D = 4,080,000 – 1,200,000 = 2,880,000$

Please use the following information to answer the next FOUR questions.

DEL Corp is an all-equity firm with 50,000 shares outstanding and a market value of $1,000,000. The firm is considering a debt issue of $400,000 with a 9% interest rate and use the proceeds to buy back its shares. Assume a perfect market with no taxes or transaction costs.

16. Jane is a shareholder who owns $1,200 worth of DEL's shares. If the firm decides to remain all-equity, what strategy could Jane take to receive the cash flows under the proposed capital structure, i.e. the capital structure with a mix of debt and equity?

A. Borrow $480 and use the money to buy 24 shares of DEL Corp.
B. Borrow $800 and use the money to buy 40 shares of DEL Corp.
C. Sell 24 shares of DEL Corp and deposit the money in the bank.
D. Sell 40 shares of DEL Corp and deposit the money in the bank.
E. Borrow $800 and sell 24 shares of DEL Corp.

All-equity D/V = 0, Proposed capital structure D/V = 400,000/1,000,000 = 0.4
To increase leverage, Jane should borrow D:
D/V=(D/1,200+D) = 0.4. Solve D, D =800
Current share price = 1,000,000/50,000 = 20
Jane can then use the borrowed $600 to buy 800/20= 40 shares

17. Now assume that DEL decided to convert to the proposed capital structure. The expected EPS under the proposed capital structure is $2.5. If Jane used homemade leverage to receive the cash flows under the all-equity capital structure, what will be Jane's ROE?

A. 2.79%
B. 8.6%
C. 8.9%
D. 11.1%
E. 16.1%

*Jane wants to reduce the leverage from D/V = 0.4 to D/V=0, so she should sell shares and despite the money in the bank. Her current claim to the firm: V=$1,200 and D = $1,200*0.4 = $480*

Suppose she deposits D:

D/V = (480–D)/(1,200 –D)=0. Solve D, D=480

Jane need to sell 480/20 = 24 shares, and afterwards she will have 1,200/20 - 24 =36 shares

*Jane's ROE = (2.5*36 + 480*9%)/1,200 = 11.1%*

18. What is the break-even EBIT so that DEL is indifferent between the current and the proposed capital structure?

A. 90,000
B. 100,000
C. 120,000
D. 900,000
E. 1,000,000

Break-even EBIT: EPS is the same under the two capital structure

The $400,000 debt will be used to buy back 400,000/20 = 20,000 shares. The firm will have 50,000 – 20,000 = 30,000 shares outstanding under the proposed capital structure.

*EBIT/50,000 = (EBIT – 400,000*9%)/30,000*

*30,000*EBIT = 50,000*(EBIT – 36,000)*

*30,000*EBIT = 50,000*EBIT – 1,800,000,000*

*20,000*EBIT = 1,800,000,000*

EBIT = 90,000

19. Now assume that DEL faces 40% corporate tax rate. What is the break-even EBIT so that the firm is indifferent between the current and the proposed capital structure? Assume that taxes only affect the earnings.

A. 54,000
B. 60,000
C. 72,000
D. 90,000
E. 600,000

Corporate tax does not change the break-even EBIT because tax reduces earnings in the same percentage under the two capital structures.

20. According to M&M Case III of capital structure, how should a firm choose its optimal capital structure?

A. Firms should always avoid borrowing because of the potential bankruptcy costs.

B. Firms should borrow as much as they can to maximize the tax benefits of debt.
C. Firms should use equity capital first and then use debt financing.
D. Firms should trade off the cost of debt against the cost of equity.
E. Firms should trade off the tax benefits of debt against the bankruptcy costs of debt.

21. CapX Corp. has a debt-to-equity ratio of 1/3. The firm has a required return on assets of 15% and cost of debt of 9%. Assume zero corporate tax. What is the company's cost of equity?

A. 17%
B. 21%
C. 27%
D. 33%
E. None of the above

*Under zero tax, WACC=w_E*R_E + w_D*R_D D/E = 1/3 -> w_D=D/V = 1/4 and w_E= E/V =3/4*
15% = (3/4)R_E+ (1/4)*9%*
*15% = 0.75*R_E +2.25%*
0.75R_E = 12.75%
R_E = 17%

22. Which of the following is true about the M&M theory in the case with corporate tax only?

A. The weighted average cost of capital of a firm goes up as the firm borrows more.
B. The weighted average cost of capital of a firm does not change with the firm's choice of capital structure.
C. The value of a firm goes up as the firm borrows more.
D. The value of a firm does not change with the firm's choice of capital structure.
E. The value of a firm goes down as the firm borrows more.

23. Which of the following are examples of the indirect costs of financial distress?

I. The cost associated with losing business because customers are afraid that the firm might not be able to service the product.
II. The cost of valuable employees leaving the firm
III. The legal cost associated with bankruptcy

A. I only
B. II only
C. I and II only
D. II and III only
E. All of I, II, and III

24. According to the Pecking Order Theory of capital structure, in which order should firms raise capital?

A. Debt first, then internal fund, and lastly external equity
B. Internal fund first, then debt, and lastly external equity
C. Internal fund first, then external equity, and lastly debt
D. External equity first, then internal fund, and lastly debt
E. External equity first, then debt, and lastly internal fund

25. Firm A is an all-equity firm with a market value of $800,000 and a share price of $5 per share. Firm A plans to repurchase $40,000 worth of shares. What will be the share price and number of shares outstanding after the repurchase?

A. Share price = $4.95; number of shares outstanding = 153,535
B. Share price = $4.95; number of shares outstanding = 160,000
C. Share price = $5; number of shares outstanding = 8,000
D. Share price = $5; number of shares outstanding = 152,000
E. Share price = $5; number of shares outstanding = 780,000

Share price remain the same after repurchase. P =5
Current # of shares outstanding = 800,000/5 = 160,000
# of shares been repurchased = 40,000/5 = 8,000
# of share outstanding after repurchase = 160,000 – 8,000 = 152,000

Please use the following information to answer the next TWO questions.
SunFinance Inc. is an all-equity firm. The firm will pay $6.4 per share dividend next year and a liquidating dividend of $24 per share at the end of the 2nd year. The firm has 600,000 shares outstanding and the current share price is $22. Suppose you own 500 of SunFinance's shares. Assume zero taxes and a discount rate of 20%.

26. If you want to receive two equal payments over the next two years, how many shares should you buy or sell at the end of the first year?

A. Buy 182 shares
B. Sell 182 shares
C. Buy 200 shares
D. Sell 200 shares
E. Sell 327 shares

PV of the equal payment D should be the share price today:
D/(1+0.2) + D/(1+0.2)^2 = 22
*1.2D + D = 22*1.2^2*
2.2D = 31.68
D = 14.40

*you want to receive 500*14.40 = 7,200*
*You receive 500*6.4= 3,200 dividend*
You are 7,200 – 3,200 = 4,000 short.
Share price at year 1 P_1 = 24/(1+0.2) = 20
Need to sell 4,000/20 = 200 shares

27. If you want to receive exactly $1,500 at the end of the first year, how many shares should you buy or sell at the end of the first year?

    A. Buy 77 shares
    B. Sell 77 shares
    C. Buy 85 shares
    D. Sell 85 shares
    E. Buy 68 shares

At the end of year 1, you want to receive 1,500
*You receive 500*6.4= 3,200 dividend*
You have an extra 3,200 – 1,500 = 1,700
Share price at year 1 P_1 = 24/(1+0.2) = 20
Need to buy 1,700/20 = 85 shares

28. A firm needs $6 million for new investments next year. Its target D/E ratio is 3/7 and the net income this year is $6.3 million. If the firm follows a residual dividend policy, what will be the amount of dividend (if any) this year?

    A. 0
    B. 0.3 million
    C. 2.1 million
    D. 2.87 million
    E. 4.5 million

D/E=3/7 -> D/V = 3/10 =0.3 and E/V = 1-0.3 = 0.7
*Debt financing for the new investment = 6m*0.3 = 1.8m*
*Equity financing for the new investment = 6m*0.7 = 4.2m < NI of 6.3m*
The firm will pay out 6.3 – 4.2 = 2.1 million dividend this year.

29. Which of the following is an implication of the signaling theory of dividends?

A. Firms should follow a residual dividend policy.
B. Firms should pay out as much dividends as possible because high dividends send a positive signal about the firm's prospects.
C. Firms should pay low or zero dividends because low dividends send a positive signal about the firm's prospects.
D. Firms should maintain a sustainable dividend policy because cutting dividends sends a bad signal about the firm's prospects.
E. Dividend policy does not matter because investors can use homemade dividends to receive the payments they desire.

30. Firm A is going to announce on January 15th that \$0.5 per share dividend will be paid on March 30th, to shareholders of record on February 20th. If you want to buy Firm A's shares and receive this \$0.5 per share dividend, you need to buy Firm A's shares on or before _____.

A. January 15th
B. February 17th
C. February 18th
D. February 20th
E. March 30th

You need to buy the shares no later than the day before ex-dividend date, February 17th.